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converted into quartzite), and clays. They were laid down in water which was too brackish at times for the establishment of a fresh-water fauna in the estuary and too fresh for a marine fauna. In short, the conditions were those of an estuary during a period of rather rapid sedimentation. This estuary probably was, as many southern estuaries are now, defended from the sea by low bars or sand islands, on the seaward side of which a marine, probably Chesapeake, fauna flourished, whose remains are now buried 700 to 1000 feet below the level of the Gulf of Mexico. On the shores grew palmettos, and drift-wood in abundance brought down by the rivers was strewn upon them. I regard it as likely that part of the gravels bored through by artesian wells, in the axis of what was the Gulf of Mississippi, are referable to an earlier period than that of the Grand-Gulf epoch, since the same processes were at work there throughout the whole of the Miocene. Coëval with the sediments of the Grand Gulf were marine deposits along the shores of the Gulf of Mexico, both east and west of the entrance to the Gulf of Mississippi. As the erosion of the land became more complete the slope of the drainage became less, the currents slower and the sediment finer and lighter, fine sand and clay replacing the gravel and coarser material of the earlier part of the epoch. In short, the clays to which Johnson has applied the name of the Pascagoula formation, began to be laid down, the sea was less energetically pushed back by the out-flowing river-waters, and the conditions became more favorable for the establishment of a brackish-water fauna.

The word formation has been used very loosely in American geological literature. In the sense in which we use the term for the Chesapeake Miocene, or the Grand Gulf, or Lafayette rocks, I conceive that these clays do not constitute a formation. They really represent for me a phase, the latest and most gentle, of the Grand Gulf, which is represented by the sands with palmetto leaves above the Chesapeake strata in the section at Alum Bluff on the Chattahoochee River. We may, slightly modifying Johnson's term, refer to them as the Pascagoula clays.

A correction is also required in the definition of these clays, or rather the fauna they contain. It is not, as supposed by Johnson, a marine fauna. All the species are or may be a part of a strictly brackish-water formation. The collections of Johnson, as well as material from the Mobile well, have been in my hands for study. The fauna comprises a large oyster, a small *Gnathodon*, which I have described under the name of *G. Johnsoni*, a small *Mastra*, also found in the Chesapeake Miocene, fragments of a *Corbicula*, and a *Hydrobia*, which I have named *H. Mobiliana*. The supposed *Venus* of which Judge Johnson speaks is the young of the *Gnathodon*. All these species are characteristic of estuaries, and will be discussed in my "Tertiary Mollusks of Florida," of which Part II. is now printing. The depth at which this fauna is encountered in the Mobile well is 735 feet, which gives an average dip from the locality near Vernal, Miss., where it comes to the surface, of about 25 feet to the mile; which corresponds very well to the dips of other strata of the Tertiary, which have been similarly traced. We are under serious obligations to Judge Johnson for the material he has so assiduously collected and which has helped so much to determine the geology of our southern tertiary formations.

WM. H. DALL,

Palæontologist U. S. Geol. Survey.

Washington, D. C., Sept. 13.

European Origin of the Aryans.

REFERRING to Dr. Isaac Taylor's letter in *Science*, Sept. 9, I must say that I cannot conceive how he can make the statements it contains, if, as he alleges, he has "carefully read" Omalius D'Hallow's writings.

Dr. Taylor's words are, "The comparatively modern theory that the Aryan race originated in the highlands of Central Asia, a theory of which D'Hallow does not seem to have heard." Now, in the article published in 1849, D'Hallow has these words: "On a voulu tirer la conclusion que ces langues (indo-germaniques) derivaient du sanscrit, et que tous les peuples qui les parlaient étaient originaires de l'Himalaya, deux propositions qui sont loin d'être incontestable."

As if this was not enough to make it clear as to what theories

he was attacking, he specifically states in a note to page 19 of his "Éléments d'Ethnographie," referring to this article in the Bulletin of the Belgian Academy, that it was directed against the linguists who derived the modern European languages and peoples from Central Asiatic ancestry; whereas it was his view that the ancient Persian and Indian tongues were imported from Europe into Asia.

I imagine that if Dr. Taylor had not had before him the "necessity of modifying former [printed] statements," he would not have overlooked this positive testimony by Omalius to himself.

Media, Pa., Sept. 12.

D. G. BRINTON.

The English Sparrow and Other Birds.

MY experience with the English sparrow accords with that of your correspondent X. in your issue of Sept. 2, 1892. Before this sparrow came and multiplied largely, my lawn was populated with cat-birds, red-birds (Cardinal grosbeck), robins, doves, blue-birds, yellow-birds, tomtits, chipping sparrows, wrens, etc.; but now the English sparrow has full possession of the entire premises. Now and then a cat-bird or a red-bird slips in as if to see whether he may again bring his family to their old umbrageous quarters, and to the rations which were provided for their support; but he is not reassured, and soon disappears.

The fecundity, energy, and perseverance of the little vandals are amazing. When the small fruits are abundant it requires a week of active shot-gun work to make them even cautious in visiting the fruit-garden. Some of them last spring took a notion to establish nests on the tops of window-shutters which opened under projecting eaves, and although their nests were swept off almost daily, they immediately began in each case to rebuild on the same spots, and continued this for at least a fortnight. In their nesting, as in some other things, they display more perseverance than discretion. The cats found that they were building in considerable numbers in a large hay-loft, and suppressed many a germ of mischief. The sparrows sometimes swarm like flies in the stable, where they will enter the troughs of horses, cows, and pigs whilst the animals are feeding.

I no longer shoot owls or hawks, but give them a welcome, and every cat and nest-hunting boy has the freedom of my premises.

Lexington, Va., Sept. 12.

W. H. RUFFNER.

BOOK-REVIEWS.

Annual Report of the Board of Regents of the Smithsonian Institution to July, 1890. Washington, Government Printing Office, 1891.

THE Smithsonian Report for 1890 contains: First, the proceedings of the Board of Regents for the session of January, 1890; second, the report of the executive committee exhibiting the financial affairs of the institution, including a statement of the Smithsonian fund and receipts and expenditures for the year 1889-1890; third, the annual report of the secretary giving an account of the operations and condition of the institution for the year 1889-1890, with statistics of exchanges, etc.; fourth, a general appendix comprising a selection of miscellaneous memoirs of interest to collaborators and correspondents of the institution, teachers, and others engaged in the promotion of knowledge. This volume is also profusely illustrated, adding greatly to its value and interest. Among the illustrations are maps of the National Zoölogical Park; maps of the Niagara River; maps of Central Africa, before and after Stanley; pictures illustrating primitive urn burial, the age of bronze in Egypt, specimens of quartz fibres; and many others too numerous to mention in detail here.

The object of the memoirs included in the general appendix is to furnish brief accounts of scientific discovery in particular directions; occasional reports of the investigations made by collaborators of the institution; memoirs of a general character or on special topics, whether original and prepared expressly for the purpose or selected from foreign journals; and briefly to present (as fully as space will permit) such papers not published in the Smithsonian Contributions or in the Miscellaneous Collections as may be supposed to be of interest or value to the numerous correspondents of the institution.

Among the papers of special interest are those by J. Scott Keltie on "Stanley and the Map of Africa;" the "Age of Bronze in Egypt," by Oscar Montélius; the "Primitive Home of the Aryans," by A. H. Sayce; a "Primitive Urn Burial," by J. F. Synder; "Criminal Anthropology," by Thomas Wilson; "Arctic Exploration," by G. S. Griffiths; "The History of the Niagara River," by G. K. Gilbert; and Weismann's "Theory of Heredity." The recently published translation of Professor Weismann's essays on heredity and allied topics has aroused the interest of the general public in the system of his biological ideas. Mr. George J. Romanes has undertaken a difficult task in endeavoring to present Professor Weismann's different theories on the subject, in a condensed form, but he has succeeded admirably. The papers on "The Ascent of Man," by Frank Baker, "The Antiquity of Man," by John Evans, and "The Progress of Anthropology" in 1890, by Professor Otis T. Mason, are of great value to those interested in the science of anthropology. The ancient problem of the squaring of the circle, which trained and untrained minds have striven in vain to solve for two and a half thousand years, is ably discussed in a paper by Hermann Schubert. He makes an historical sketch of the problem from the earliest times to the present day, tracing the various theories from the times of pre-Grecian antiquity to the verdict given by Professor Lindemann of Königsberg in June, 1882: "It is impossible with ruler and compasses to construct a square equal in area to a given circle." These are the words of the final determination of a controversy which is as old as the history of the human mind. But the race of circle-squarers, unmindful of the verdict of mathematics, that most infallible of arbiters, will never die out so long as ignorance and the thirst for glory shall be united.

"The Progress of Astronomy" during 1889 is clearly shown in the paper by William C. Winlock, the compiler having made free use of reviews, in the various branches of astronomy, contributed by specialists to the *Athenæum*, *Nature*, *Journal of the Astronomical Society of the Pacific*, the *Observatory*, *Bulletin Astro-*

nomique, the *Astronomical Journal*, and other periodicals. Among these are articles on stellar parallax, comets, meteors, variable and colored stars, stellar spectra, astronomical photography, the planets, solar spectrum, the sun, the solar system, and the minor planets. Astronomical bibliography for 1889 is given at the conclusion of this paper including the most important books and articles for that year, which have attracted the compiler's notice; some few titles having been taken from reviews and catalogues, where the publications themselves have not been accessible. The title of the paper by Robert Simpson Woodward on "The Mathematical Theories of the Earth" implies a community of interest amongst astronomers and mathematicians. In fact, the study of the earth's crust, considered in its entirety and in its relations to similar bodies of the universe, has long been the special province of astronomers and mathematicians. Since the times of Galileo, Kepler, and Copernicus, it has supplied a perennial stimulus to observation and investigation, and it promises to tax the resources of the ablest observers and analysts for some centuries to come. The structure of the earth, as a mechanical and physical question, is closely connected with the origin and formation of its satellite and of the planets and satellites belonging to the same solar system. A paper "On the Physical Structure of the Earth," by Henry Hennessy, treats of this subject, under the following headings: "the mechanical and physical properties of the matter composing the earth, the rotation of the earth considered as partly fluid and partly solid," and a note concerning "the annual recession calculated on the hypothesis of the earth's solidity." The papers on "Glacial Geology," by Professor James Geikie; "The Mediterranean, Physical and Historical," by Sir R. Lambert Playfair; and the "History of Geodetic Operations in Russia," by Colonel B. Witshowski of the General Staff, and Professor J. Howard Gore, are full of interest.

The paper on "The Physical Basis of Musical Harmony," by Professor Sylvanus P. Thompson, is a history of the researches of Dr. R. Koenig, who is known not only as the constructor of the

Publications Received at Editor's Office.

BONNEY, G. E. Induction Coils. New York, Macmillan & Co. 12p. 231 p. Illustrated. \$1.
COMMISSIONERS OF FISHERIES of the State of New York. Twentieth Annual Report, 1892. Albany, State Printer. 8°. 346 p.
DAY, DAVID T. Mineral Resources of the United States. Washington, Government. 8°. 679 p.
DOUGHTY, FRANCIS W. Evidences of Man in the Drift. New York. 8°. Paper. 18 p.
GRAFF, LUDWIG VON. Bibliothek des Professors der Zoologie und vergl. Anatomie. Leipzig, Wilhelm Engelmann. 8°. Paper. 353 p.
IMPERIAL UNIVERSITY OF JAPAN. Calendar for the Year 1890-91. Calendar for the Year 1891-92. Tokio, The University. 2 vols. 12°. Paper.

Reading Matter Notices.

Ripans Tabules cure hives.
Ripans Tabules cure dyspepsia.

Societas Entomologica.

International Entomological Society, Zurich-Hottingen, Switzerland.
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To exchange for books on birds or insects, or for back volumes of American Naturalist; Ecker's "Anatomy of the Frog," Packard's "Guide," Guyot's "The Earth and Man," Rockhill's, "The Land of the Lamas," Parker's "Biology," Shoemaker's "Heredity, Health and Personal Beauty," Dexter's "The Kingdoms of Nature," all new. M. J. ELROD, Ill. Wes. Univ., Bloomington, Ill.

For Sale.—About 1087 volumes of the private library of Dr. Nicolas León, formerly director of the Museum at Morelia, embracing publications of special value for Mexicoologists, like those of Bishop Zumárraga (16th century), of Siquenza y Gongora, of Aleman, etc., the Missal of Spinoza, all very scarce; manuscripts on the history of Michoacán and other Mexican States, on the Tarasco (the Indian language of Michoacán) and several works, of which the only copy known to exist is in this collection. Parties interested in the sale please address Dr. NIC. LEÓN, Portal de Matamoras, Morelia, Mexico.

INDEXES

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A JOHNS HOPKINS graduate (1892) desires a position as instructor in mathematics and physics. Address A. B. TURNER, Johns Hopkins University, Baltimore, Md.

finest acoustical instruments in the world, but as an investigator of great originality and distinction, and author of numerous memoirs on acoustics. In his *atelier* on the Quai d'Anjou he lives and works in seclusion, surrounded by his instruments, even as our own Faraday lived and worked amongst his electric and magnetic apparatus. Besides the great tonometer, his colossal masterpiece, Dr. Koenig's collection includes several large wave sirens and innumerable pieces of apparatus in which his ingenious manometric flames are adapted to acoustical investigation. There also stands his tonometric clock, a time-piece governed, not by a pendulum, but by a standard tuning-fork, the rate of vibration of which it accurately records.

The final chapters of the volume deal with "Manners and Customs of the Mchaves," by George A. Allen; "Criminal Anthropology," by Thomas Wilson; "Color Vision and Color Blindness," by R. Brudenell Carter; "Technology and Civilization," by F. Reuleaux; the "Ramsden Dividing Engine," by J. E. Watkins; "Memoir of Elias Loomis," by H. A. Newton; and a memoir of "William Kitchen Parker." The life and work of Elias Loomis form no mean portion of the wealth of Yale University, and he published 164 contributions to astronomy, meteorology, and other branches of scientific research. He was a man possessed of considerable scholarship, of positive convictions, and of a willingness to follow at all hazards wherever truth and duty, as he conceived them, might lead. Professor William Kitchen Parker was born at Dogsthorpe, near Peterborough, June 23, 1823, and died suddenly of syncope of the heart July 3, 1890. He was a fellow of the Royal, Linnean, Zoölogical, and Royal Microscopical Societies; and honorary member of King's College, London, the Philosophical Society of Cambridge, and the Medical Chirurgical Society. He was also a member of the Imperial Society of Naturalists of Moscow, and corresponding member of the Imperial Geological Institute of Vienna and the Academy of Natural Sciences of Philadelphia. In 1885 he received from the Royal College of Physicians the Bayly medal, "*Ob physiologiam feliciter excultam.*" He was

"an unworldly seeker after truth, and loved by all who knew him for his uprightness, modesty, unselfishness, and generosity to fellow-workers, always helping young inquirers with specimens and information; he was suddenly lost to sight as a friend and father, but remains in the minds of fellow-workers, of those whom he so freely taught, and of his stricken relatives, as a great and good man, whose beneficent influence will ever be felt in a wide-spreading and advancing science and among thoughtful and appreciative men in all time."

MARY PROCTOR.

St. Joseph, Mo., Sept. 9.

Trees of the Northern United States. By AUSTIN C. APGAR. New York, American Book Co. 224 p. 12°. \$1.

THE ground covered by this handy volume is the study, description, and determination of the wild and cultivated trees found east of the Rocky Mountains and north of the southern boundaries of Virginia and Missouri. Its author, who is professor of botany in the New Jersey State Normal School, was evidently governed in its preparation by the idea that, while it can hardly be expected that the great majority of people will ever become scientific in any line, it is possible to induce nearly every pupil to become interested in and fully acquainted with such things, for instance, as the trees of his neighborhood. The plan of the work, therefore, is such as to first arouse the pupil's interest in the subject, and then to satisfy the consequent desire for information, attention being mainly directed to the leaves, the wood, the bark, and, in an elementary way, the fruit. These are the parts that must be thoroughly known by all who wish to readily recognize trees, and they, or most of them, may be found and studied throughout the greater part of the year. Though the book may be open to adverse criticism when viewed from the standpoint of the advanced botanists, it should be borne in mind that it is not written for them, but for the average teacher who has had no strictly scientific training. We may add that the illustrations are numerous and well adapted for the purpose in view.

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